

LEMI-16 Simple Pendulum with Electronic Timer

- *Hall sensor and electronic timer*
- *Accurate angle and length measurements*
- *High measurement accuracy*
- *Affordable*



Pendulum experiment is important in general physics teaching. In the past, this experiment was limited to a small-angle approximation. Traditional methods using manual stopwatch timing have significant measurement errors, and multiple-period measurement and averaging method is used to reduce the measurement error. Due to the presence of air damping, swing angle gradually decays with time degrading the measurement accuracy.

This apparatus uses an integrated Hall sensor and electronic timer, which can accurately measure the period under large swing angle in a few swinging cycles, so the effect of air damping on pendulum angle can be ignored. Based on the relationship between the period and the angle, it is possible to acquire a precise value of the gravitational acceleration by extrapolating the angle to zero degree.

Experimental Contents

1. Measure swinging period with a fixed string length & calculate gravitational acceleration.
2. Measure swinging period by varying string length & calculate gravitational acceleration.
3. Verify pendulum period is proportional to the square of string length.
4. Measure swinging period by varying initial swing angle & calculate gravitational acceleration.
5. Use extrapolation method to acquire accurate gravitational acceleration at small swinging angle.
6. Study the influence of non-linear effect under large swing angles.
7. Mutate the pendulum while measuring period & calculate location of the string mutation point.

Specifications

Angle measurement	Range: - 45° ~ + 45°; accuracy: 1°
Pendulum length	Range: 60 ~ 80 cm; accuracy: 1 mm
Preset counting number	Max: 60 times
Automatic timer	Resolution: 1 ms; uncertainty: < 3 ms

Note: above product information is subject to change without notice.